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(71) Applicant

Bosch-Siemens Hausgeräte GmbH

(Incorporated in FR Germany)

Hochstrasse 17, 8000 München 80, Federal Republic of Germany

(72) Inventor

Karl Thier

(74) Agent and/or Address for Service

Dr. Walther Wolff & Co.,

6 Buckingham Gate, London SW1E 6JP

(51) INT CL⁴

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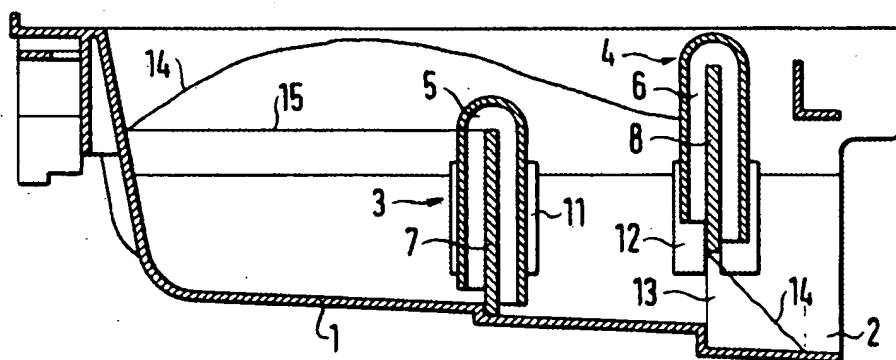
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(54) Washing agent feed device in a washing machine

(57) A washing machine is provided with a washing agent feed device which can, according to need, be used to feed agent in either powder or liquid form. For this purpose, a pouring limitation wall (3 or 4) is guided at both side walls of an agent storage chamber in substantially vertically extending oriented guides (11) and its lower outline is adapted to the shape of the bottom (1) of the chamber. The limitation wall can be pushed out of an upper end setting as far as down to the bottom of the chamber. Discharge of liquid agent from the chamber can be effected by way of siphon (5) incorporated in the limitation wall (3). Discharge of powder agent can be effected by flushing through a passage (13) under the limitation wall in its raised position.

FIG. 1



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FIG. 1

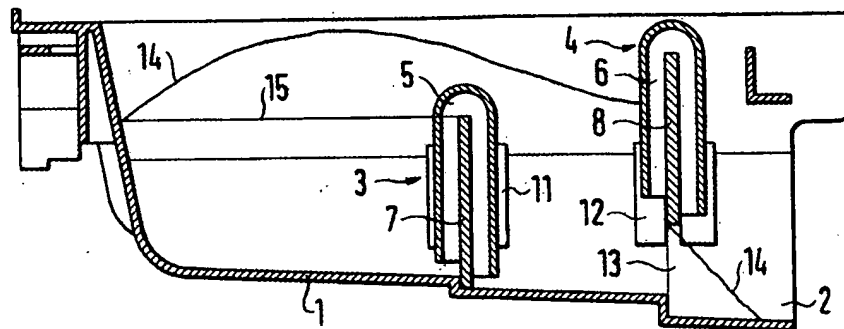
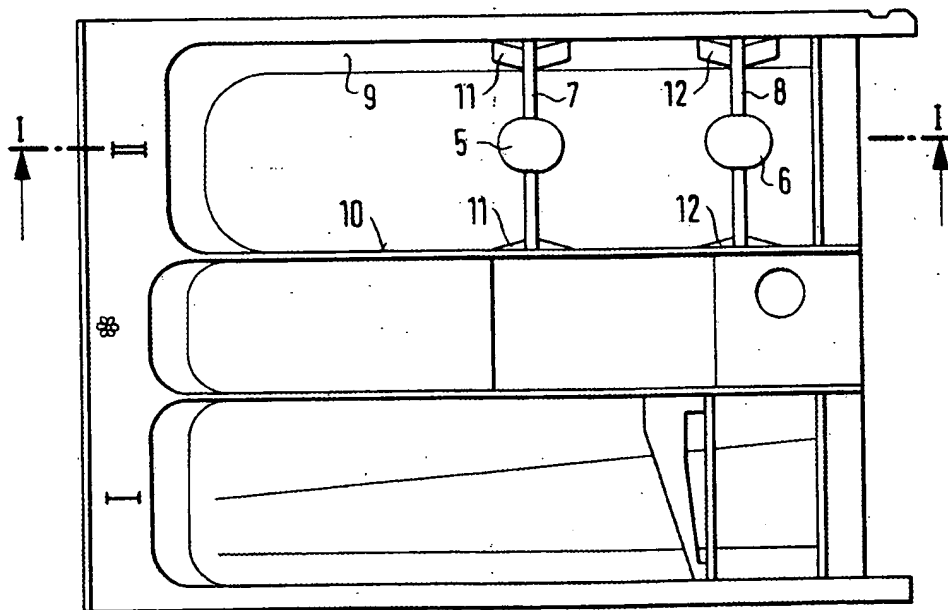


FIG. 2



SPECIFICATION

Washing agent feed device in a washing machine

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The present invention relates to a washing machine with a washing agent feed device.

Washing machines with such a device are known from DE-OS 19 55 256 and from DE-OS 31 36 768. In the case of the washing machine known from DE-OS 19 55 256, two different kinds of chambers are provided in a washing agent flushing-in bowl. One of these kinds of chambers has pouring limitation walls which serve for filling with a charge of powder washing agent, whilst the other kind of chamber has pouring limitation walls which serve for the filling with a charge of liquid washing agent. The first-mentioned walls have a passage arranged at the bottom for the flushing-out of the powder washing agent, whilst the second-mentioned walls completely seal the chamber but co-operate with a siphon which, on reaching of its overflow level, conveys the liquid almost completely out of the associated chamber.

A combination of the two kinds of limitation walls of DE-OS 19 55 256 in order to provide a single chamber for both powder and liquid washing agent is not possible, since the passage at the bottom would on the one hand allow liquid agent to flow away at once and a closed limitation wall on the other hand would also force powder in part through the siphon. This would then soon clog up and render the flushing-in bowl unusable for further use.

By contrast to the drawer-type washing agent flushing-in bowl of DE-OS 19 55 256, such a bowl can be arranged in a top-loading washing machine according to DE-OS 31 36 768 as immovable equipment accessible from above. However, the comments with reference to the limitation walls apply equally well here.

There is thus a need for a washing machine with washing agent feed device by which both powder and liquid washing agent can, according to the choice of the operator, be charged into the chambers. Such a device should be able to be operated in a simple manner and be manufactured cheaply and without complication.

According to the present invention there is provided a washing machine provided with a washing agent feed device comprising a washing agent storage chamber with an inlet for flushing water and an outlet for water and washing agent mixture, and a flow limitation wall member arranged in the chamber to retain washing agent therein prior to discharge and slidably guided in guidemeans at side walls of the chamber to be movable between an upper position in which a passage leading to the outlet is provided below the member and a lower position in which the member extends down to the base of the chamber,

the outline shape of the wall member in the lower region thereof substantially corresponding with the cross-sectional profile of the lower region of the chamber.

70 In a preferred embodiment the feed device comprises at least one chamber which is flushed out by incoming water and the wall at the outflow side of which is constructed as pouring limitation wall member with a passage arranged at the bottom for the outflow of the mixture of water and washing agent. The wall member is guided in substantially vertically oriented slide thrust guides at both the side walls of the chamber and its lower outline is matched to the bottom shape of the chamber, the member being pushable out of its upper setting as far as the bottom of the chamber.

Such a displaceable wall member can be brought by means of a single action by the operator into the upper position for charging of the chamber with powder washing agent or into the lower position for charging with liquid agent. The guides at the side walls can be formed during, for example, injection moulding of the device from plastics material. The wall member itself can be cut out of a plastics material panel as separate component.

In one preferred embodiment, the lower outline of the wall member conforms sealingly to the chamber bottom shape and the member is provided with a siphon which is effective in the lower setting of the member. The guides and the contact surfaces of the chamber bottom and of the wall member can be so matched to each other that the chamber is tightly closed off in its lower setting. For improvement of the seal, the lower contact surface of the member can be provided with an integrally formed sealing lip which, in the lower setting, fits closely against the bottom of the chamber. The wall member together with the siphon can be conveniently formed as an integral injection-moulded part.

In another embodiment, the outline of the wall member is matched to the chamber bottom shape only to the extent that liquids with a viscosity similar to that of the water can flow off out of the chamber within at most 30 minutes in the lower setting of the member, while liquids with a viscosity similar to that of the usual commercially available soft rinsing agent and liquid washing agents can pass through the gap only drop by drop after about 10 minutes at the earliest. In such a construction, the use of a siphon can be dispensed with completely and thus avoid any problems due to encrustation with washing powder residues. The lower contact surface of the member instead provides a defined leakage gap relative to the chamber bottom. This leakage gap should preferably be dimensioned according to the flow parameters mentioned above and thus act in desired manner with ratio of water viscosity to rinsing or washing agent viscosity of about 1:6.

With advantage, a plurality of slide guides are arranged at both side walls of the chamber at different spacings from the outlet. As a result, transfer of the wall member from one position to the other is possible when, for example for powder washing agent, a greater chamber volume is required than for liquid agent. It can also be of advantage to utilise different positions of the wall member for adjustment to different ranges of water hardness.

An embodiment of the present invention will now be more particularly described by way of example with reference to the accompanying drawings, in which:

Figure 1 is a cross-section, along the line I-I of Fig. 1, of a washing agent feed device in a washing machine embodying the invention; and

Figure 2 is a plan view of the device of Fig. 1.

Referring now to the drawings, there is shown a washing agent flushing-in bowl in a washing machine, the bowl having three chambers which are identified at their front upper side by I, II and a flower symbol, respectively. In the illustrated embodiment, only the chamber II is equipped with pouring limitation walls as described below, but each of the other chambers can be similarly equipped.

The bottom 1 of the chamber has a downward gradient in direction towards an outflow opening 2. In the illustrated embodiment, the bottom 1 is stepped at the positions of vertically slidable pouring limitation walls 3 and 4, in order that siphons 5 and 6, which are provided as component of the walls, have openings which are lower at the outflow side when the walls are in the lowermost positions. A bulkhead partition 7 or 8 of the wall 3 or 4 is guided in slide thrust guides 11 or 12 formed on side walls 9 and 10 of the chamber.

The walls 3 and 4 can be detented in their respective position by suitable means (not shown). Remaining underneath each wall in its upper position is a passage 13, which at most has such a height that, on the assumption of a normal angle of repose of 45°, powder washing agent 14 trickling through does not reach the outflow opening 2.

In the lowermost setting of the wall 3, the side of the chamber remote from the outflow opening 2 is closed off. Liquid washing agent filled in up to the level 15 will remain in the chamber. On the supply of water this level rises beyond the overflow level of the siphon 5 and initiates the automatic suction effect of the siphon. The siphon 5 then conveys almost the entire volume of liquid out of the chamber so that it can flow to the opening 2. The remnant underneath the suction opening of the siphon 5 would gradually soak away due to unavoidable but minimal leakage between the partition 7 and the bottom 1.

Normally, only one of the illustrated walls 3

and 4, which are of identical construction, should be used provided the chamber II has the same profile at both illustrated positions. Each of the walls 3 and 4 can be brought into the lowered or raised setting as desired. Slide thrust guides for such walls can be provided in one or more positions in each chamber. This is of advantage particularly if the washing agent doses must be different, according to whether the agent is powder or liquid, for the same kind of washing process. However, several positions of guides are also advantageous for adjustment to different ranges of water hardness.

In departure from the illustrated embodiment, the pouring limitation wall can be constructed without a siphon if a defined leakage is maintained at the contact surface between bulkhead partition and bottom. The chamber bottom 1 can then possibly be structured without steps. In such a construction, the leakage should permit the outflow of water from the chamber, when the bulkhead partition is lowered, within at most 30 minutes. However, the leakage must in turn be so small that liquids which are at least about 6 times as viscous as water, for example soft rinsing agents or liquid washing agents, can pass through the leakage gap drop by drop after about 10 minutes at the earliest.

CLAIMS

1. A washing machine provided with a washing agent feed device comprising a washing agent storage chamber with an inlet for flushing water and an outlet for water and washing agent mixture, and a flow limitation wall member arranged in the chamber to retain washing agent therein prior to discharge and slidably guided in guide means at side walls of the chamber to be movable between an upper position in which a passage leading to the outlet is provided below the member and a lower position in which the member extends down to the base of the chamber, the outline shape of the wall member in the lower region thereof substantially corresponding with the cross-sectional profile of the lower region of the chamber.

2. A washing machine as claimed in claim 1, wherein the wall chamber is sealably engageable in its lower position with wall means defining the lower region of the chamber and is provided with a siphon effective in the lower position of the member.

3. A washing machine as claimed in claim 1, wherein the wall member is so co-operable in its lower position with wall means defining the lower region of the chamber as to bound a leakage gap permitting substantially complete outflow from the chamber of liquid with a viscosity similar to that of water within at most 30 minutes but constraining outflow from the chamber of liquid with a viscosity substantially six times that of water to take

place drop by drop and only after a period of about 10 minutes.

4. A washing machine as claimed in any one of the preceding claims, comprising a plurality of such guide means disposed at respectively different spacings from the outlet.

5. A washing machine provided with a washing agent feed device substantially as hereinbefore described with reference to the accompanying drawings.

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